

LOW-DAMAGE ETCHED/REGROWN INTERFACES OF GaInAsP/InP WIRELIKE LASER WITH STRAIN-COMPENSATED MQW STRUCTURE

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Abstract

To evaluate etched/regrown interfaces of strain-compensated GaInAsP/InP five-quantum-well wirelike lasers with the wire widths of 43 nm and 70 nm fabricated by EB lithography, CH₄/H₂-reactive ion etching, and organo-metallic-vapor-phase-epitaxy regrowth, temperature dependences of the threshold current density, the spontaneous emission spectrum and efficiency were compared with those of un-etched quantum-well lasers. As a result, the product of the surface recombination velocity and the carrier lifetime $S \cdot \tau$ at the etched/regrown interfaces was evaluated to be less than 2 nm at room temperature. No degradation in the spontaneous emission efficiency was observed within measured temperature range up to 85°C for both of lasers. These results indicate that high quality etched / regrown interfaces can be obtained with GaInAsP/InP fine structures.